

## WHAT IS CLAIMED IS:

1. A method of melting metal of a predetermined liquidus temperature in a heated melting chamber having a bottom;  
5 the method comprising the steps of:  
providing a bath of said metal in molten state in said melting chamber, said bath having a certain level and a temperature above said liquidus temperature;  
introducing solid metal into said bath so as to melt said  
10 solid metal during a melting time;  
generating a stream of molten metal in said melting chamber, said stream having certain parameters of flow including flow energy and flow rate;  
choosing said parameters of flow such that the melting  
15 time is, in maximum, half the melting time without said stream under the condition that the temperature of said molten metal, when measured at at least one place in a distance of 5 mm in maximum from said solid metal introduced into said melting chamber, does not  
20 fall below said liquidus temperature.
2. Method as claimed in claim 1, wherein said metal is a non-iron metal.
- 25 3. Method as claimed in claim 2, wherein said non-iron metal is magnesium.
4. Method as claimed in claim 1, wherein said distance amounts to 3 mm in maximum.
- 30 5. Method as claimed in claim 4, wherein said distance amounts to about 1 mm.
6. Method as claimed in claim 1, wherein said condition is  
35 fulfilled at more than one place in said distance.

7. Method as claimed in claim 1, wherein said stream of molten metal has a main direction aiming away from said level of said bath.
- 5 8. Method as claimed in claim 1, wherein said stream of molten metal has a main direction aiming away from said bottom of said melting chamber.
9. Method as claimed in claim 1, wherein said stream of molten metal has a substantially horizontal main direction.
- 10 10. Method as claimed in claim 1, wherein said stream of molten metal is directed towards said solid metal.
- 15 11. Method as claimed in claim 10, wherein said stream of molten metal, having passed said solid metal, is directed against a heated surface of said melting chamber.
12. Method as claimed in claim 1, wherein said at least one place is within said stream of molten metal.
- 20 13. Method as claimed in claim 12, wherein said at least one place is downstream said solid metal in said melting chamber.
- 25 14. Method as claimed in claim 1, wherein said temperature is measured to control and maintain said condition.
15. Method as claimed in claim 1, wherein said temperature is measured to control heating of said melting chamber.
- 30 16. An apparatus for melting metal of a predetermined liquidus temperature, comprising  
a melting chamber for receiving said metal in a solid  
35 state, said melting chamber having lateral walls and a bottom wall;

heating means for heating at least one of said walls for providing a melt of said metal within said melting chamber up to a certain level;

pump means having at least one inlet opening and at least one outlet opening and a pumping element between said openings for pumping said melt, said inlet opening and said outlet opening being both in said melting chamber and below said level.

17. Apparatus as claimed in claim 16, wherein said pump means are of the type having a variable number of revolutions, said pump means further including control means for varying said number of revolutions.

18. Apparatus as claimed in claim 16, further comprising wall means forming an extraction chamber, and transfer means for transferring melt from said melting chamber into said extraction chamber.

19. Apparatus as claimed in claim 16, wherein said transfer means comprise communication means between said melting chamber and said extraction chamber.

20. Apparatus as claimed in claim 16, wherein not only said inlet opening and said outlet opening are in said melting chamber and below said level, but also said pumping element.

21. An apparatus for melting metal of a predetermined liquidus temperature, comprising a melting chamber for receiving said metal in a solid state, said melting chamber having lateral walls and a bottom wall;

heating means for heating at least one of said walls for providing a melt of said metal within said melting chamber up to a certain level;

pump means having at least one inlet opening and at least one outlet opening for pumping said melt, said inlet opening and said outlet opening being both in said melting chamber and below said level; and  
5 means forming a defined deposit area for said solid metal.

22. Apparatus as claimed in claim 21, wherein at least one of said openings of said pump means is directed towards said  
10 means forming a defined deposit area.

23. Apparatus as claimed in claim 22, wherein it at least said outlet opening that is directed towards said means forming a defined deposit area.

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24. Apparatus as claimed in claim 21, wherein said means forming a defined deposit area comprise holding means for receiving said solid metal and holding it in a distance from said bottom wall.

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25. Apparatus as claimed in claim 21, further comprising at least one temperature sensor arranged below said level and in a distance from both said heating means and said means forming a defined deposit area.

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26. Apparatus as claimed in claim 25, wherein said distance amounts to 5 mm in maximum.

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27. Apparatus as claimed in claim 25, wherein said distance amounts to 3 mm in maximum.

28. Apparatus as claimed in claim 25, wherein said distance amounts to about 1 mm.

35 29. An apparatus for melting metal of a predetermined liquidus temperature, comprising

a melting chamber for receiving said metal in a solid state, said melting chamber having lateral walls and a bottom wall;

5 heating means for heating at least one of said walls for providing a melt of said metal within said melting chamber up to a certain level;

10 pump means having at least one inlet opening and at least one outlet opening for pumping said melt, said inlet opening and said outlet opening being both in said melting chamber and below said level; and

sensor means for sensing at least one of the parameters of the temperature of said melt and the level of said melt, said sensor means providing an output signal.

15 30. Apparatus as claimed in claim 29, wherein said sensor means comprise at least one temperature sensor arranged in a distance from said heating means.

20 31. An apparatus for melting metal of a predetermined liquidus temperature, comprising

a melting chamber for receiving said metal in a solid state, said melting chamber having lateral walls and a bottom wall;

25 heating means for heating at least one of said walls for providing a melt of said metal within said melting chamber up to a certain level;

30 pump means having at least one inlet opening and at least one outlet opening for pumping said melt, said inlet opening and said outlet opening being both in said melting chamber and below said level; and

sensor means for sensing at least one of the parameters of the temperature of said melt and the level of said melt, said sensor means providing an output signal; and

35 automatic control means receiving said output signal and providing at least one control signal at their output for controlling at least one of the parameters includ-

ing flow energy, flow rate, flow temperature and said level.

32. Apparatus as claimed in claim 31, wherein said sensor  
5 means comprise at least one temperature sensor, said output of said automatic control means being coupled to said heating means for controlling their power.
33. Apparatus as claimed in claim 31, wherein said sensor  
10 means comprise a level sensor, the output of said automatic control means being coupled to said pump means to control them.
34. An apparatus for melting metal of a predetermined liquid-  
15 us temperature, comprising  
a melting chamber for receiving said metal in a solid state, said melting chamber having lateral walls and a bottom wall;  
heating means for heating at least one of said walls for  
20 providing a melt of said metal within said melting chamber up to a certain level;  
pump means having at least one inlet opening and at least one outlet opening for pumping said melt, said inlet opening and said outlet opening being both in said  
25 melting chamber and below said level to generate a flow of melt; and  
guiding means for guiding said flow of melt in a predetermined direction.
- 30 35. Apparatus as claimed in claim 34, wherein said guiding means are formed and arranged to direct said flow of melt away from said level.
36. Apparatus as claimed in claim 34, wherein said guiding  
35 means are formed and arranged to direct said flow of melt away from said bottom wall.

37. Apparatus as claimed in claim 34, wherein said guiding means are formed and arranged to direct said flow of melt in a substantially horizontal main direction.
- 5 38. Apparatus as claimed in claim 34, wherein said guiding means are formed and arranged to direct said flow of melt first to said solid metal and then against a heated wall of said melting chamber.
- 10 39. Apparatus as claimed in claim 34, wherein said guiding means are formed at least in part on said pump means.